

Figure 1 A

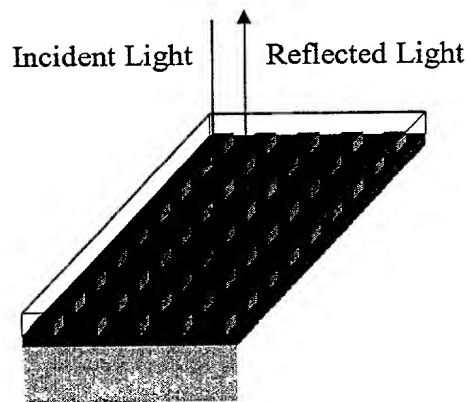


Figure 1 B

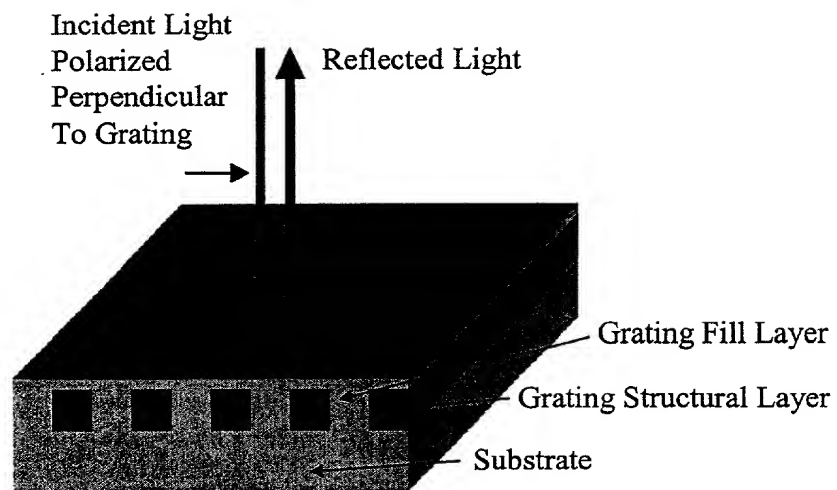


Figure 2

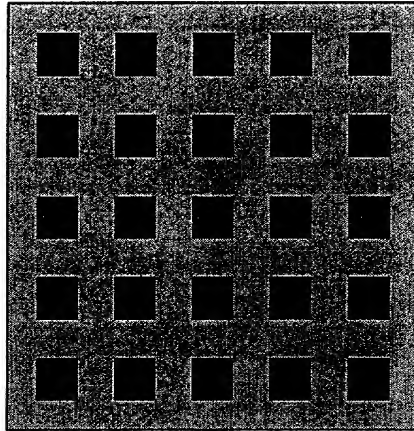


Figure 3A

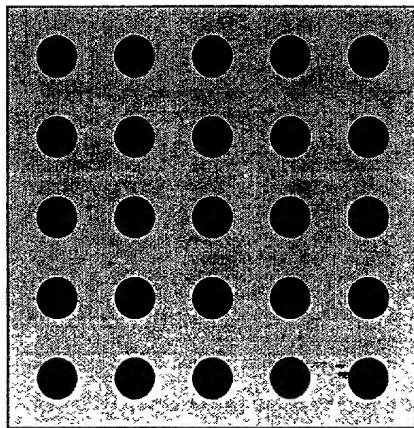


Figure 3B

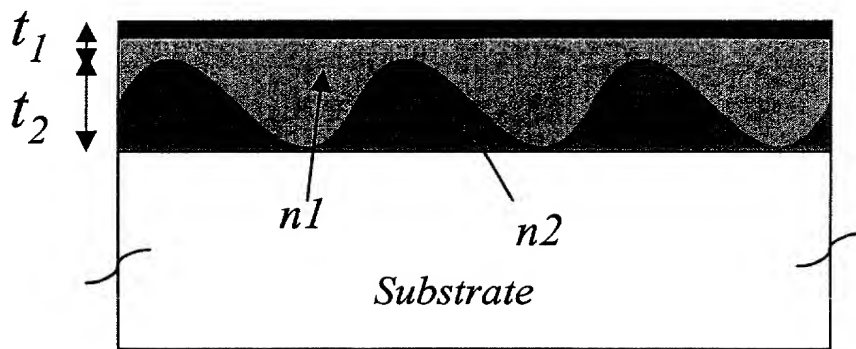


Figure 4

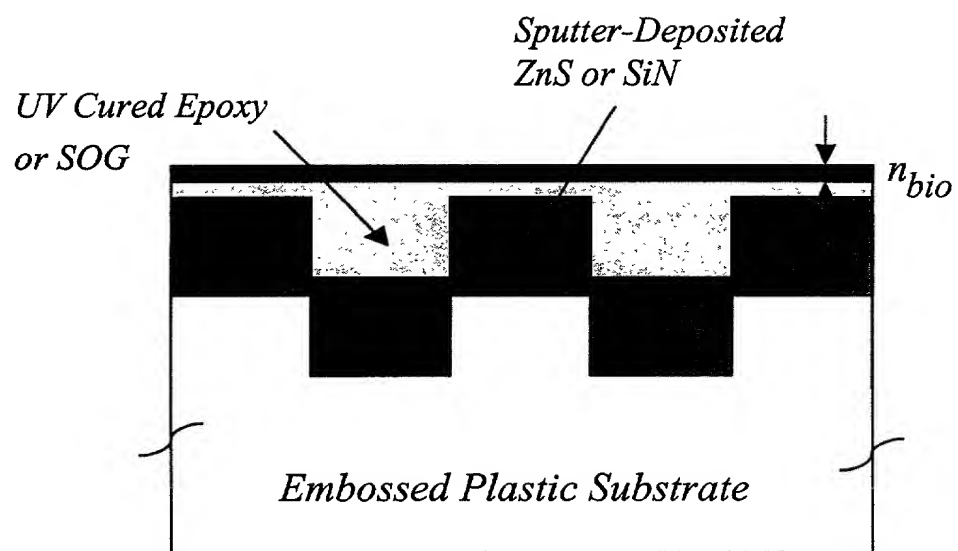


Figure 5

Amine

- Sulfo-succinimidyl-6-(biotinamido)hexanoate (Sulfo-NHS-LC-Biotin)
 - Streptavidin / avidin then biotinylated molecule
- N,N'-disuccinimidyl carbonate (DSC); • -NH₂, non-cleavable
- Dimethyl pimelimidate (DMP); • -NH₂, non-cleavable
- Dimethyl 3,3'-dithiobispropionimidate (DTBP); • -NH₂, cleavable
- 1-Ethyl-3-(3-Dimethylaminopropyl)carbodiimide Hydrochloride (EDC) and N-Hydroxysulfosuccinimide (Sulfo-NHS); • -COOH
- Sulfo-succinimidyl 6-[α-methyl-α-(2-pyridyl-dithio)toluamido] hexanoate (Sulfo-LC-SMPT); • -SH, cleavable
- N-(B-Maleimidopropoxy)succinimide ester (BMPS)
 - -SH₂, non-cleavable
- Sulfo-succinimidyl 4-[N-maleimidomethyl]cyclohexane-1-carboxylate (Sulfo-SMCC); • -SH, non-cleavable

Aldehyde

- Directly with aldehyde or first amino then aldehyde
 - -NH₂

Ni(II)

- Using Nitrilotriacetic acid (NTA) group, which forms a chelate with Ni(II)
 - His-tagged molecules

Figure 6

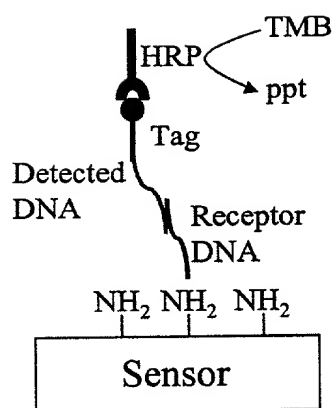


Figure 7A

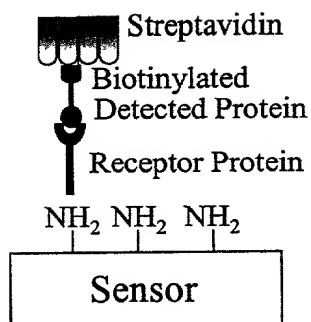


Figure 7B

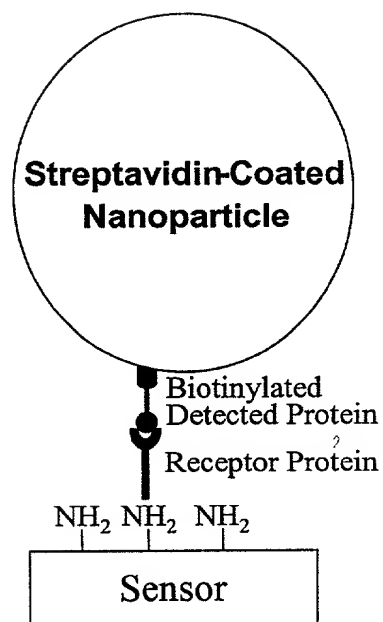


Figure 7C

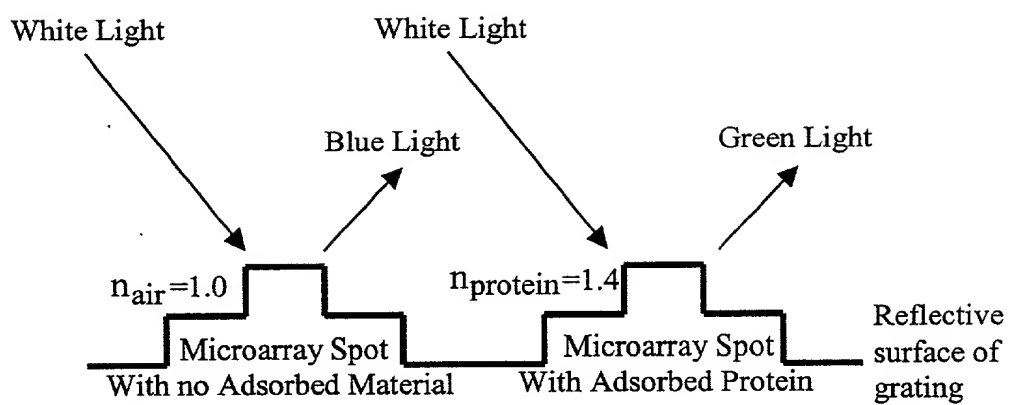
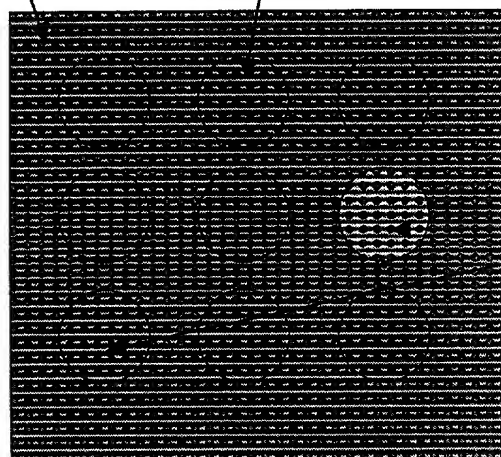


Figure 8

Grating structure

Microarray location
without affinity-adsorbed
molecules



Microarray
locations with
affinity-adsorbed
molecules

Figure 9

□ Microtiter plate

□ Microarray slide

Plastic bottomless microtiter plate.
Holes in plate are open from top to bottom

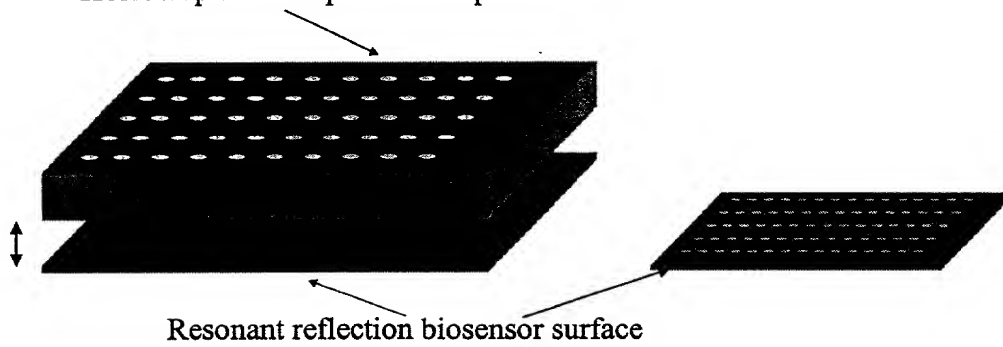


Figure 10A

Figure 10B



11/52

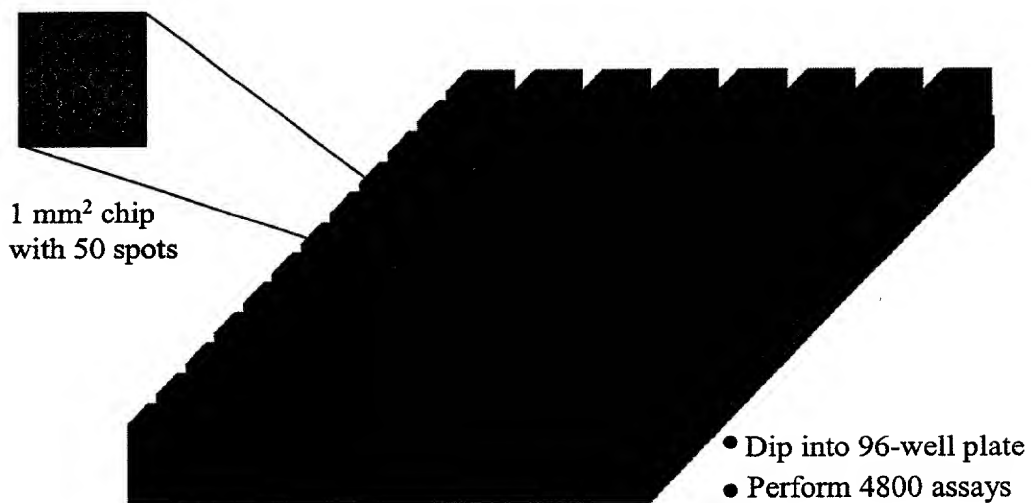


Figure 11

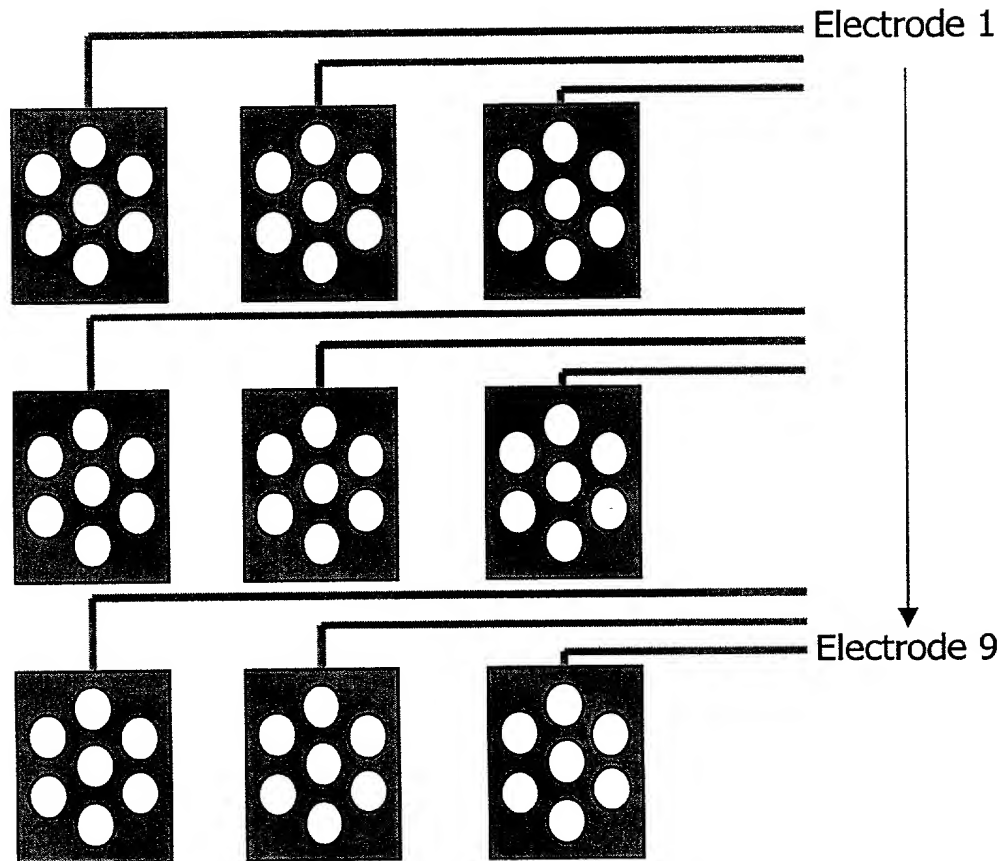
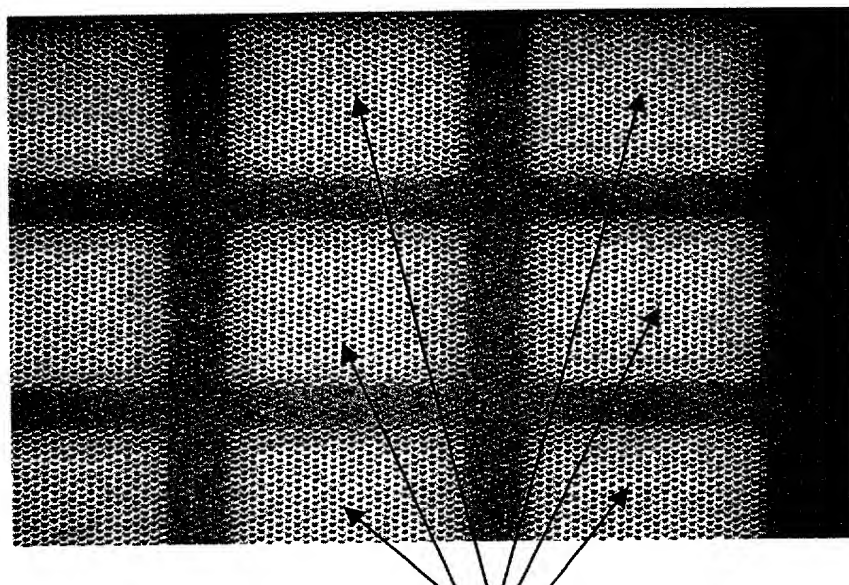


Figure 12



13/52



Separate electrode grating regions

Figure 13

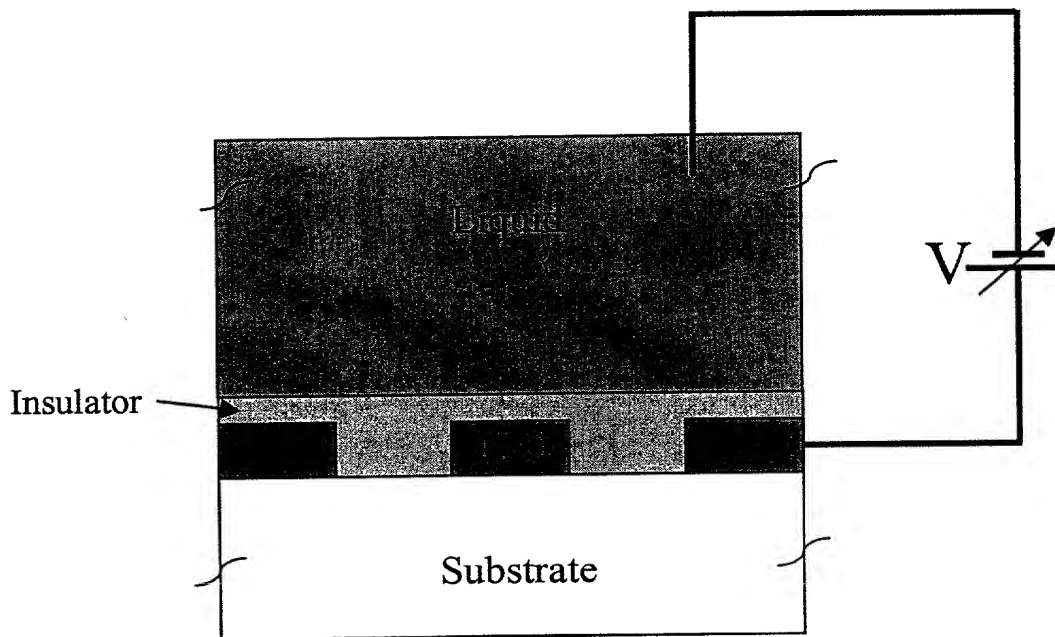


Figure 14

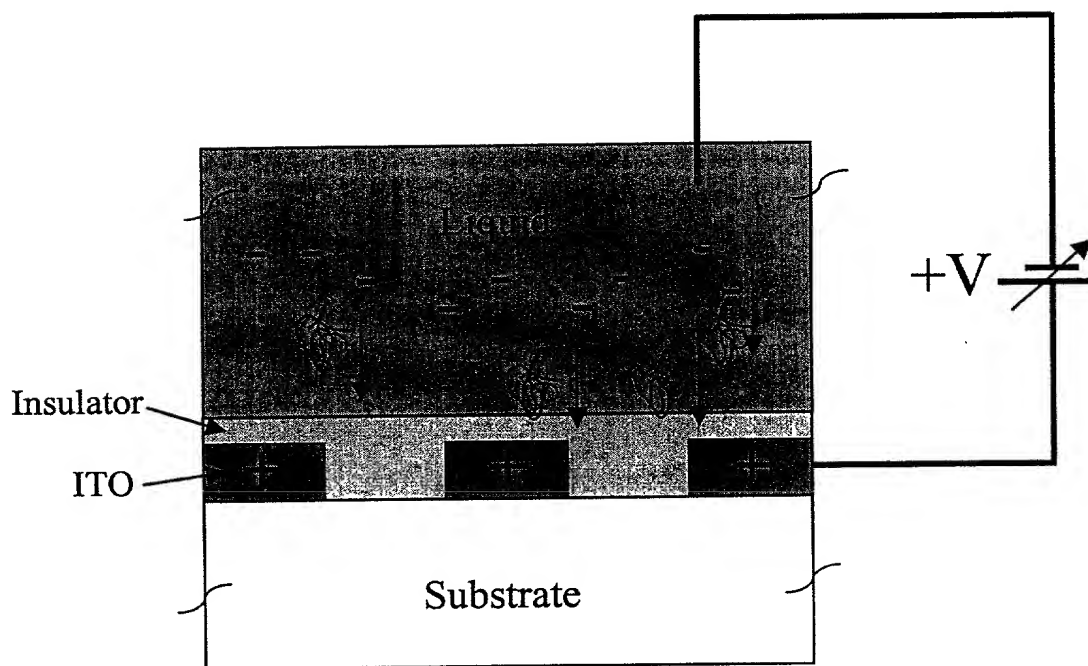


Figure 15



16/52

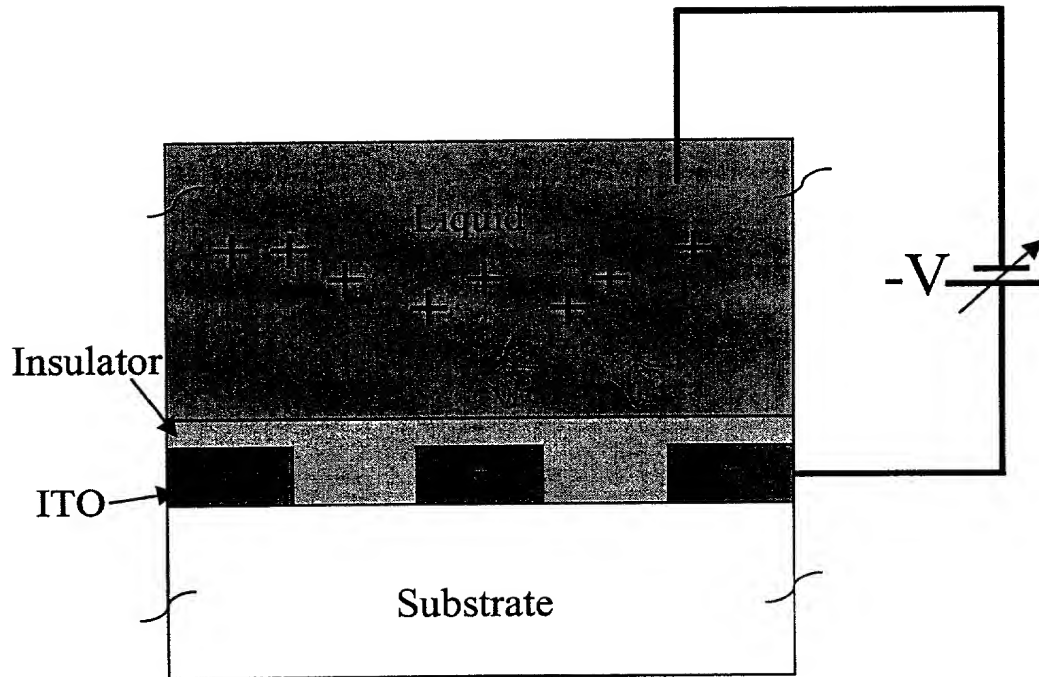


Figure 16

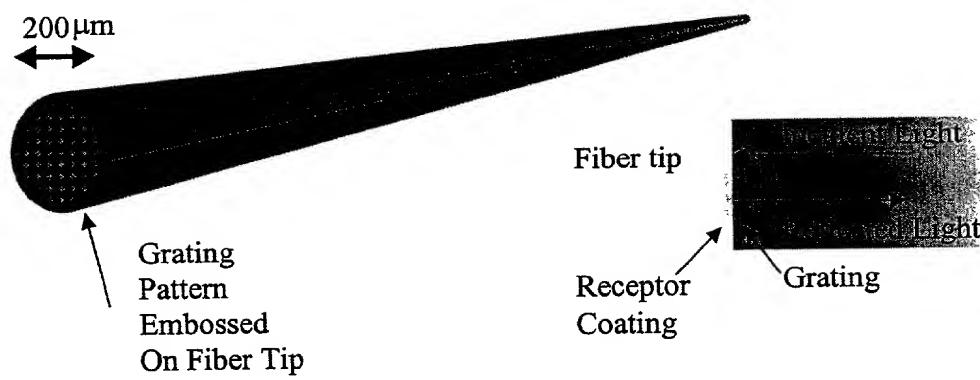


Figure 17

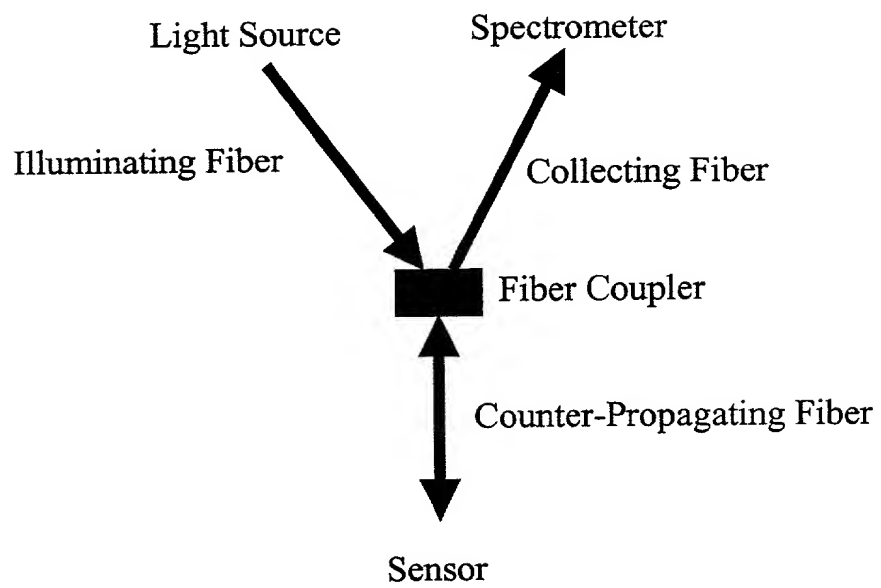


Figure 18



19/52

Peak Wavelength

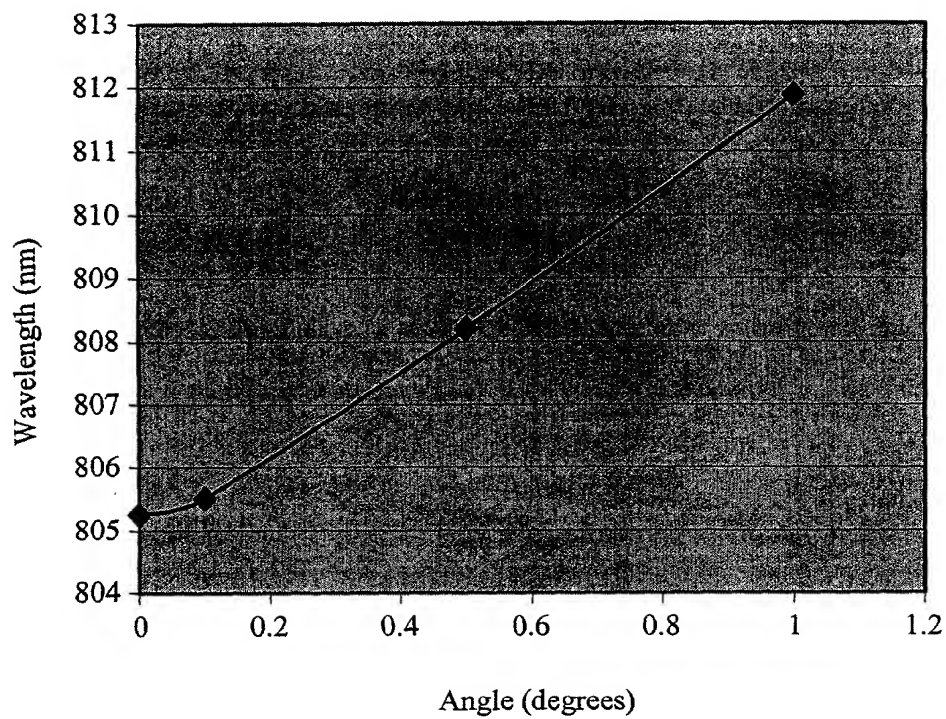


Figure 19

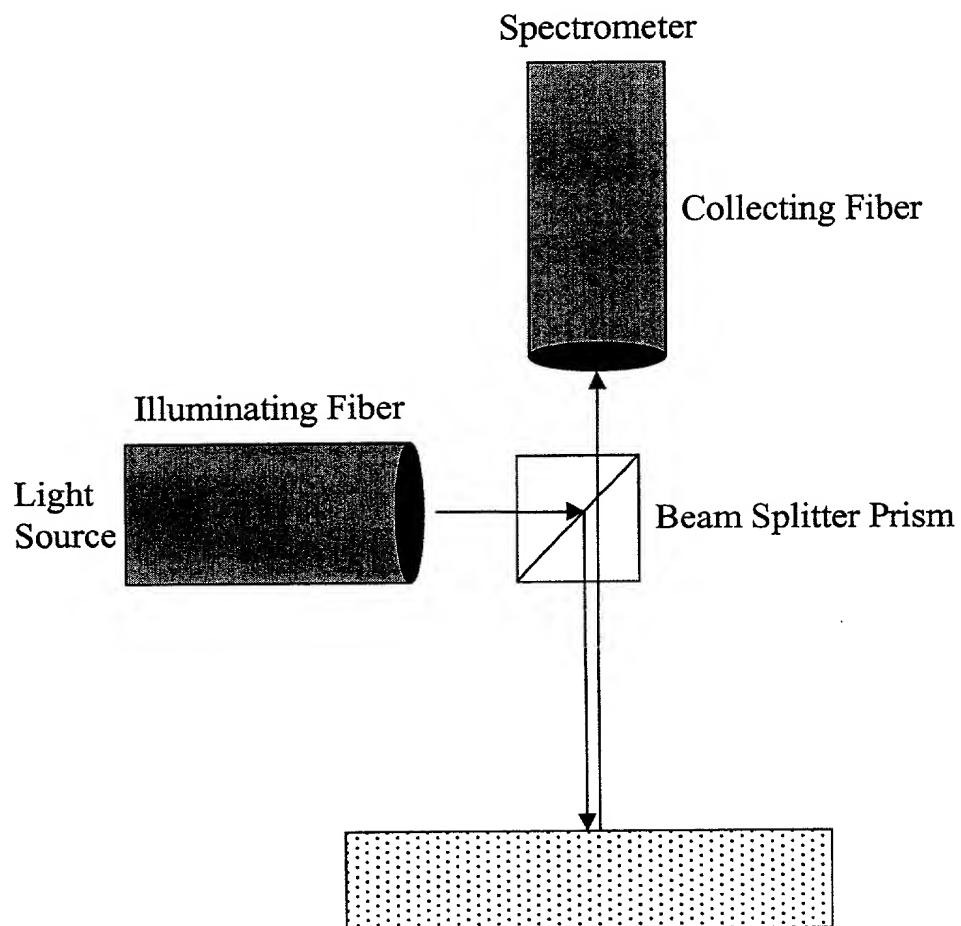


Figure 20

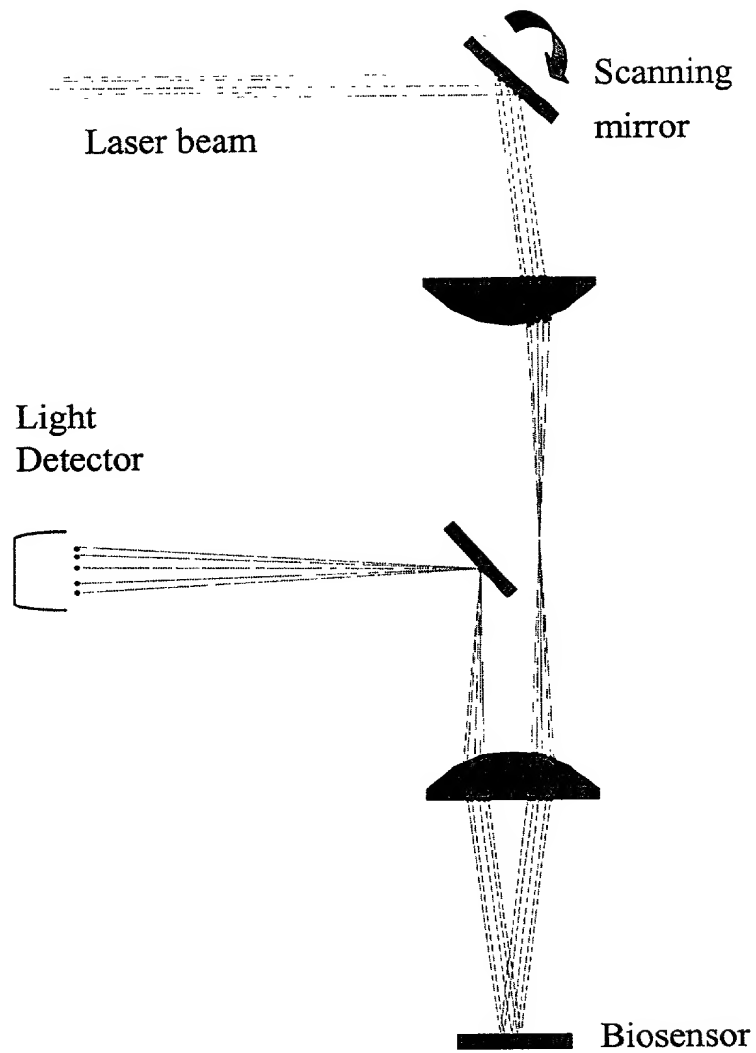


Figure 21

20140725000000

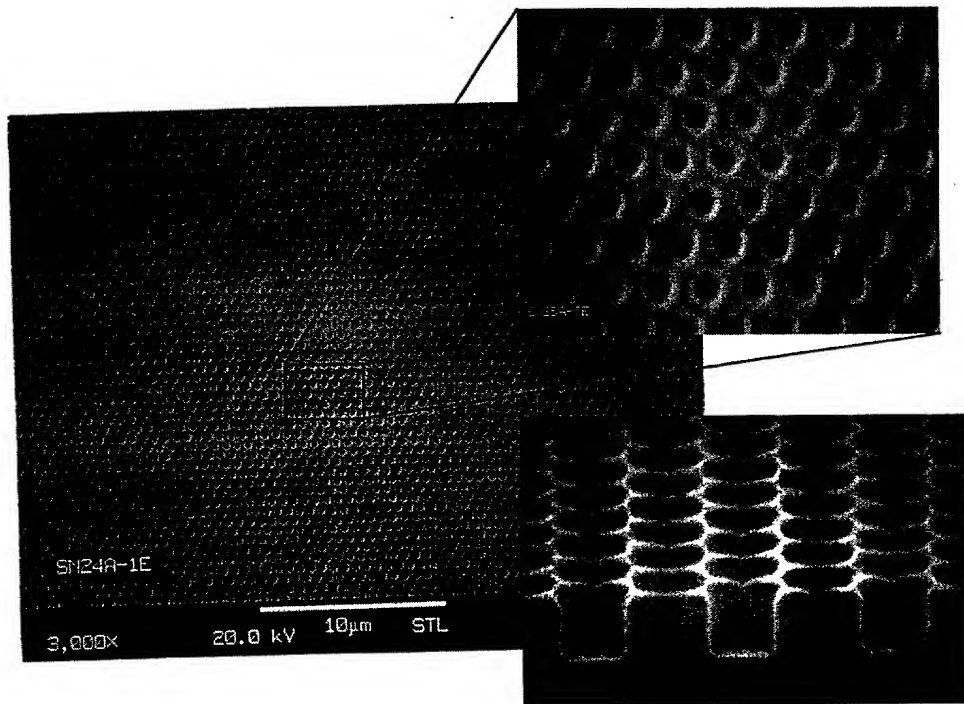


Figure 22

Country	Year	Value	Unit
Algeria	1970	1000000	kg
Algeria	1971	1000000	kg
Algeria	1972	1000000	kg
Algeria	1973	1000000	kg
Algeria	1974	1000000	kg
Algeria	1975	1000000	kg
Algeria	1976	1000000	kg
Algeria	1977	1000000	kg
Algeria	1978	1000000	kg
Algeria	1979	1000000	kg
Algeria	1980	1000000	kg
Algeria	1981	1000000	kg
Algeria	1982	1000000	kg
Algeria	1983	1000000	kg
Algeria	1984	1000000	kg
Algeria	1985	1000000	kg
Algeria	1986	1000000	kg
Algeria	1987	1000000	kg
Algeria	1988	1000000	kg
Algeria	1989	1000000	kg
Algeria	1990	1000000	kg
Algeria	1991	1000000	kg
Algeria	1992	1000000	kg
Algeria	1993	1000000	kg
Algeria	1994	1000000	kg
Algeria	1995	1000000	kg
Algeria	1996	1000000	kg
Algeria	1997	1000000	kg
Algeria	1998	1000000	kg
Algeria	1999	1000000	kg
Algeria	2000	1000000	kg
Algeria	2001	1000000	kg
Algeria	2002	1000000	kg
Algeria	2003	1000000	kg
Algeria	2004	1000000	kg
Algeria	2005	1000000	kg
Algeria	2006	1000000	kg
Algeria	2007	1000000	kg
Algeria	2008	1000000	kg
Algeria	2009	1000000	kg
Algeria	2010	1000000	kg
Algeria	2011	1000000	kg
Algeria	2012	1000000	kg
Algeria	2013	1000000	kg
Algeria	2014	1000000	kg
Algeria	2015	1000000	kg
Algeria	2016	1000000	kg
Algeria	2017	1000000	kg
Algeria	2018	1000000	kg
Algeria	2019	1000000	kg
Algeria	2020	1000000	kg
Algeria	2021	1000000	kg
Algeria	2022	1000000	kg
Algeria	2023	1000000	kg
Algeria	2024	1000000	kg
Algeria	2025	1000000	kg
Algeria	2026	1000000	kg
Algeria	2027	1000000	kg
Algeria	2028	1000000	kg
Algeria	2029	1000000	kg
Algeria	2030	1000000	kg
Algeria	2031	1000000	kg
Algeria	2032	1000000	kg
Algeria	2033	1000000	kg
Algeria	2034	1000000	kg
Algeria	2035	1000000	kg
Algeria	2036	1000000	kg
Algeria	2037	1000000	kg
Algeria	2038	1000000	kg
Algeria	2039	1000000	kg
Algeria	2040	1000000	kg
Algeria	2041	1000000	kg
Algeria	2042	1000000	kg
Algeria	2043	1000000	kg
Algeria	2044	1000000	kg
Algeria	2045	1000000	kg
Algeria	2046	1000000	kg
Algeria	2047	1000000	kg
Algeria	2048	1000000	kg
Algeria	2049	1000000	kg
Algeria	2050	1000000	kg
Algeria	2051	1000000	kg
Algeria	2052	1000000	kg
Algeria	2053	1000000	kg
Algeria	2054	1000000	kg
Algeria	2055	1000000	kg
Algeria	2056	1000000	kg
Algeria	2057	1000000	kg

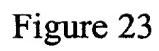


Figure 23

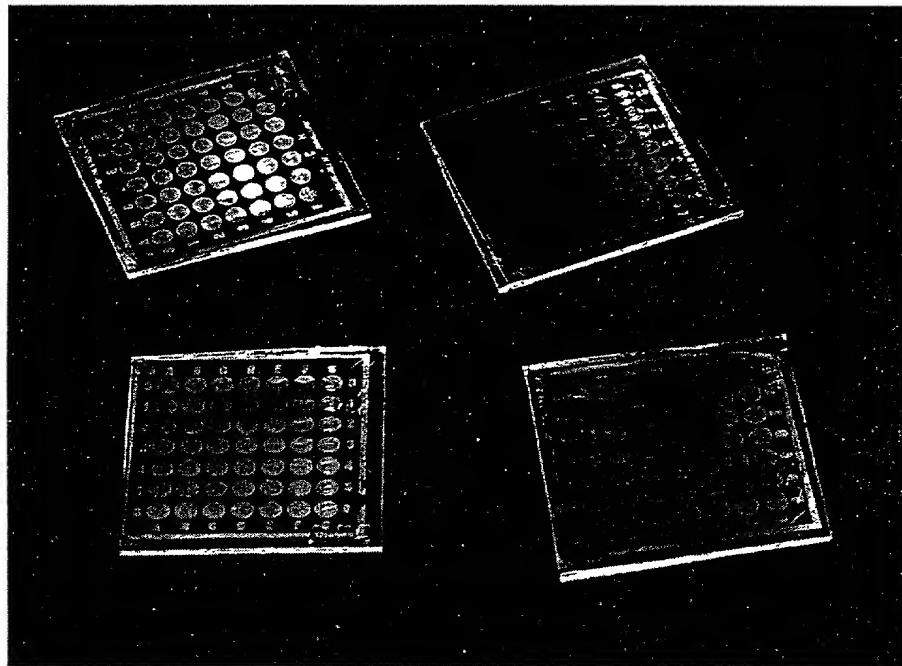


Figure 24

Albumin Deposition on Resonant Reflector

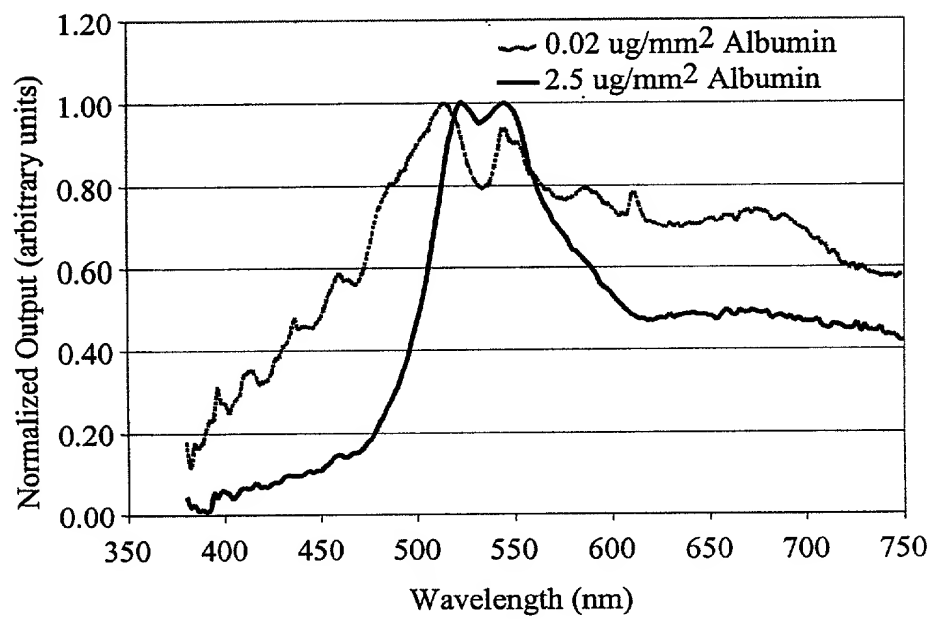


Figure 25

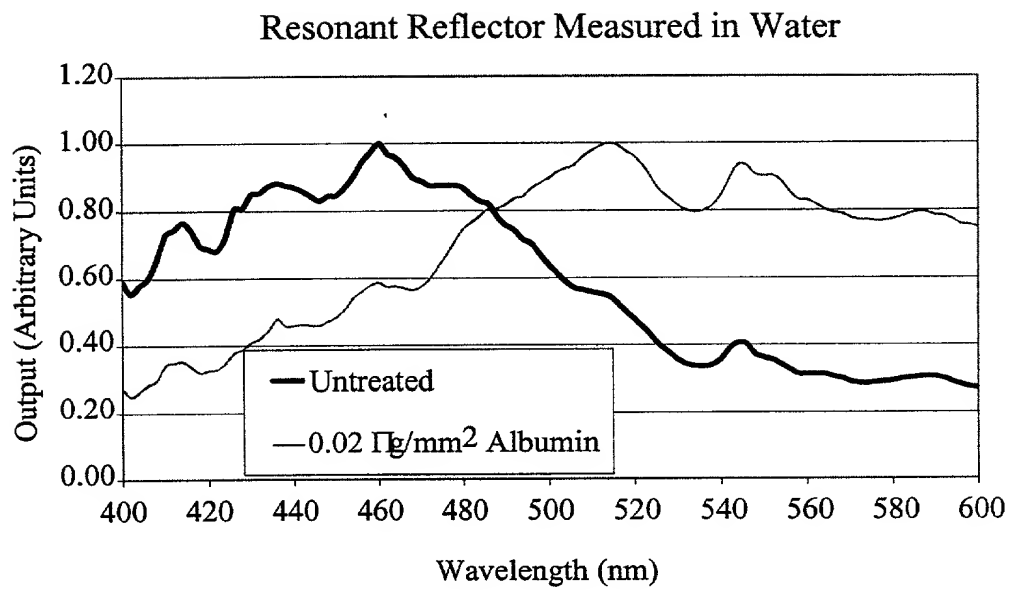


Figure 26

Bacteria immobilization on structure

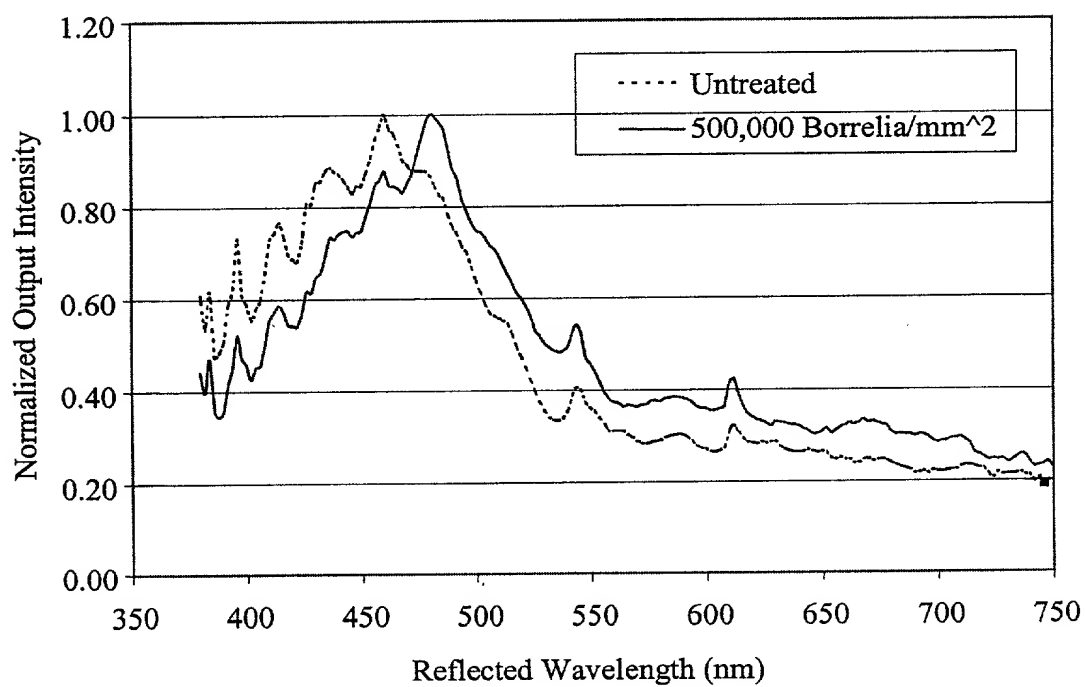


Figure 27

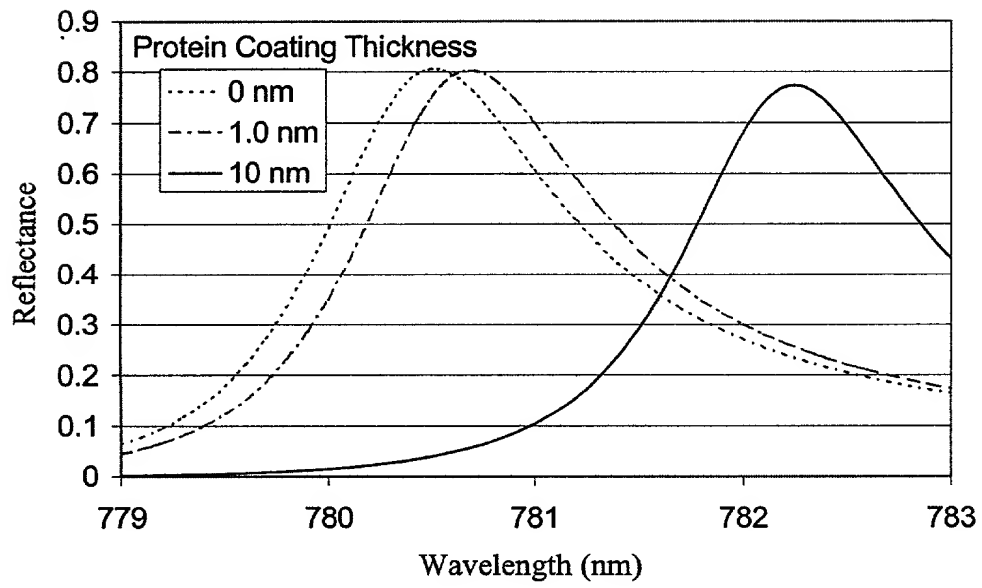


Figure 28

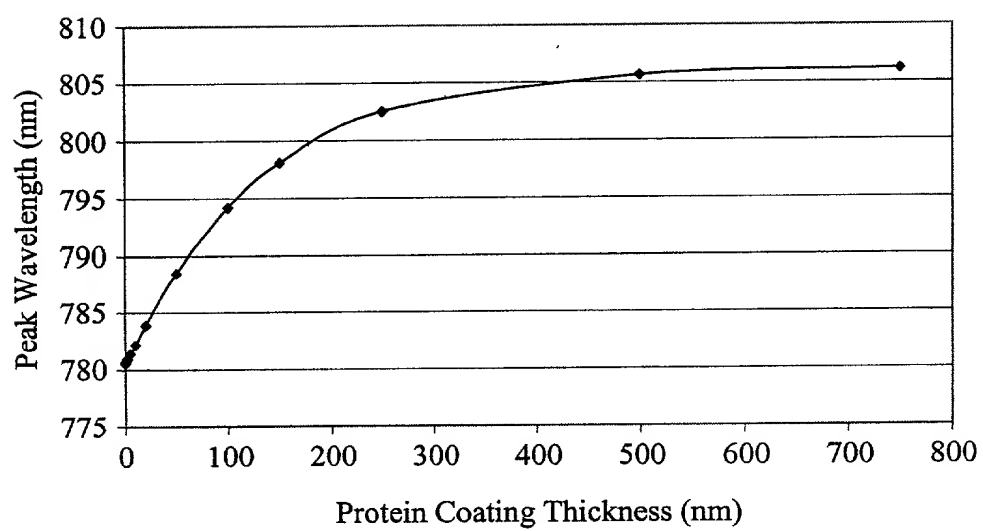


Figure 29

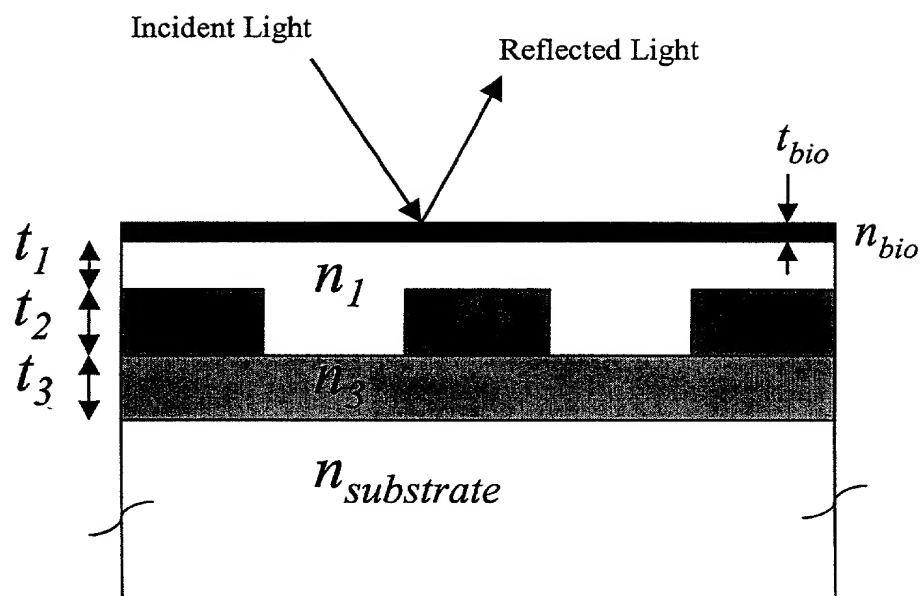


Figure 30

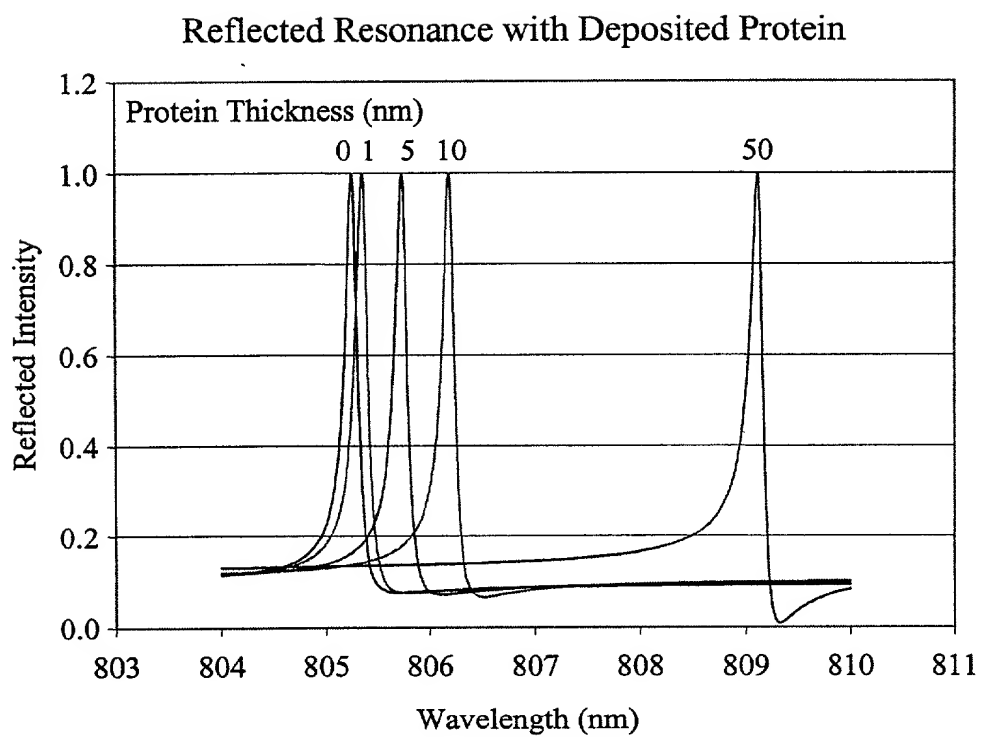


Figure 31

Resonant Peak Wavelength Dependence
on Deposited Protein Thickness

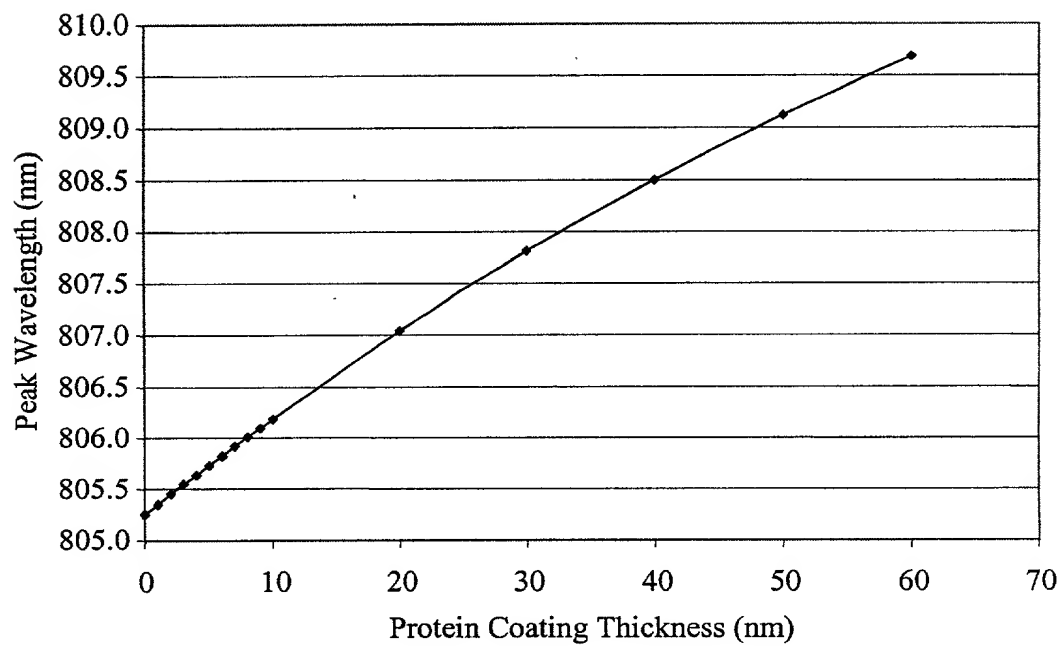


Figure 32

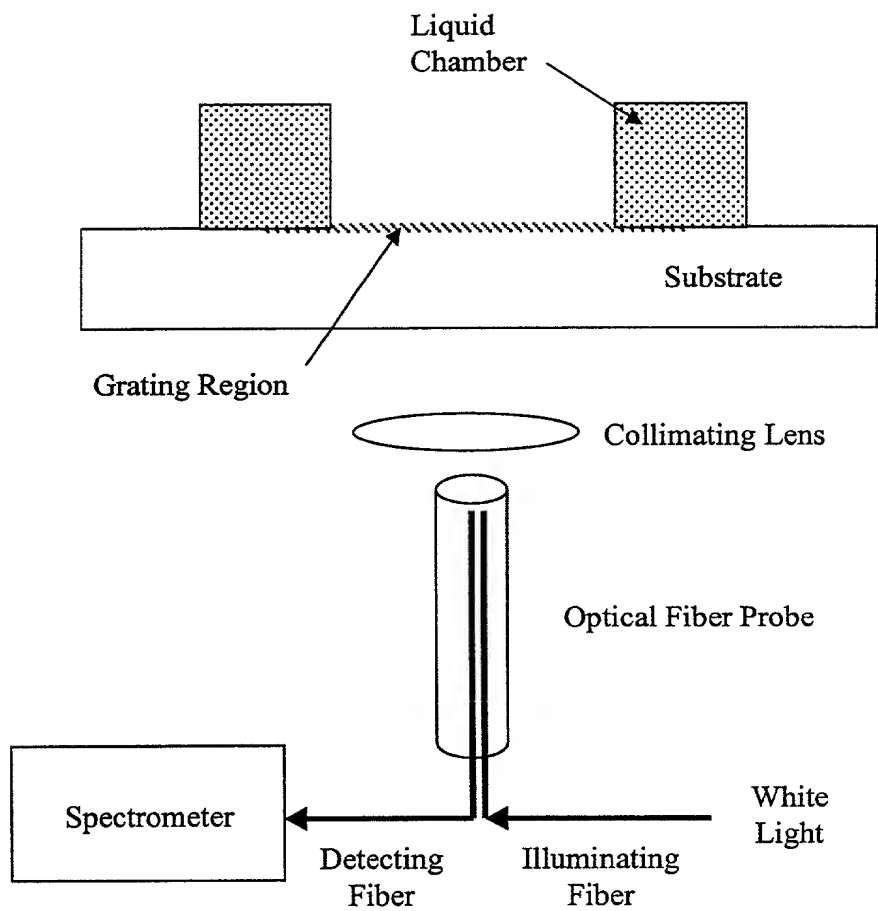


Figure 33

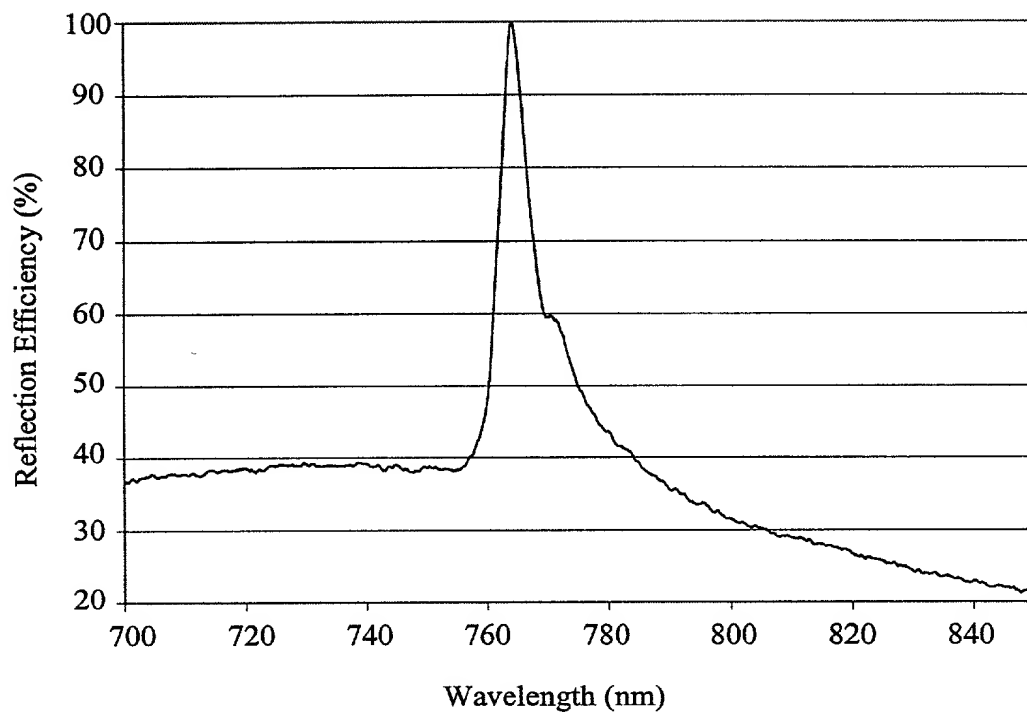


Figure 34

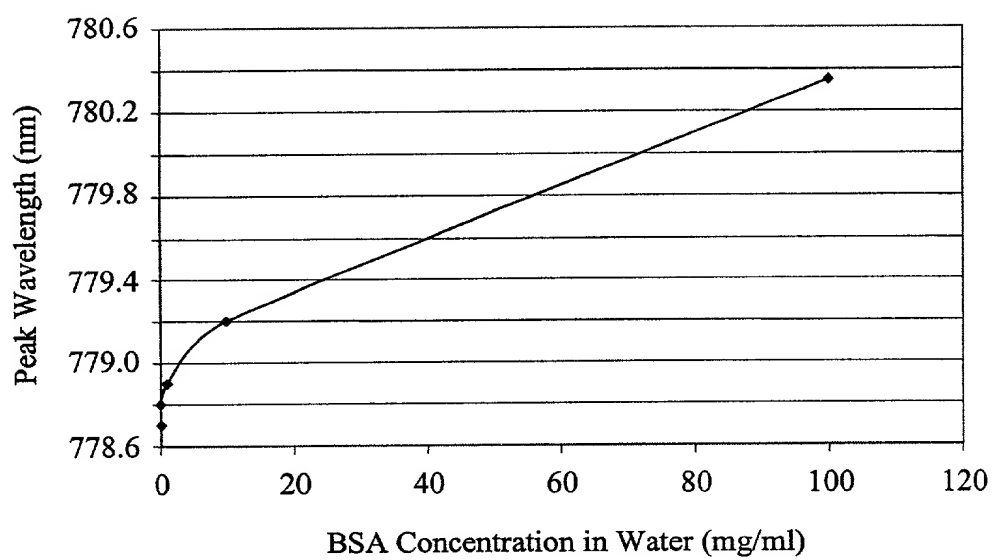


Figure 35

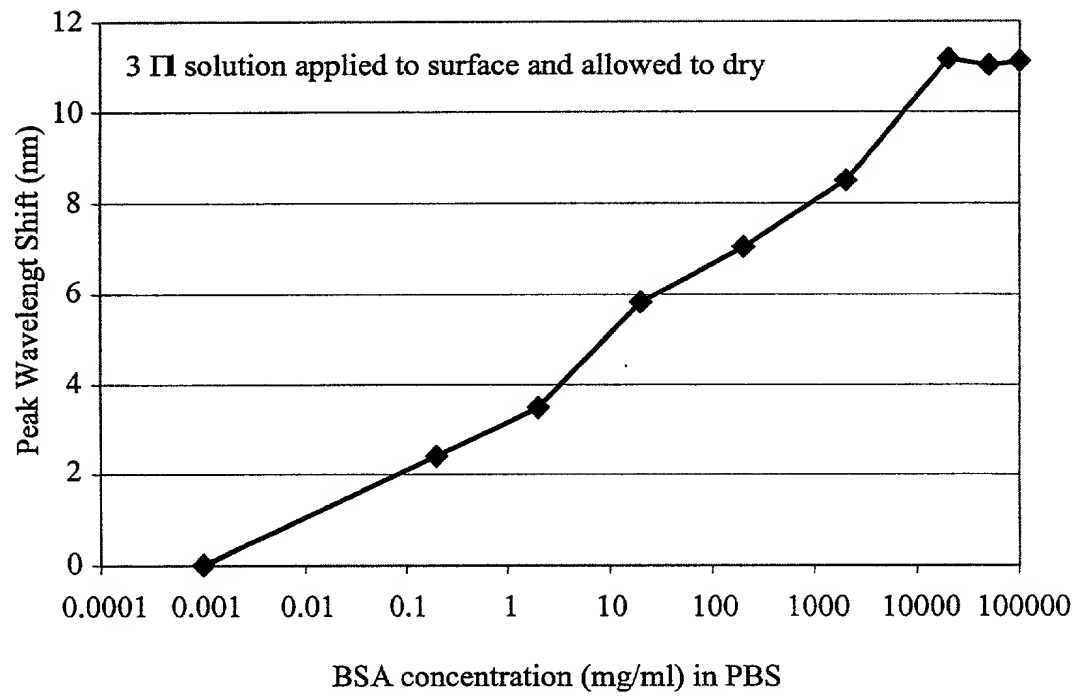


Figure 36

37/52

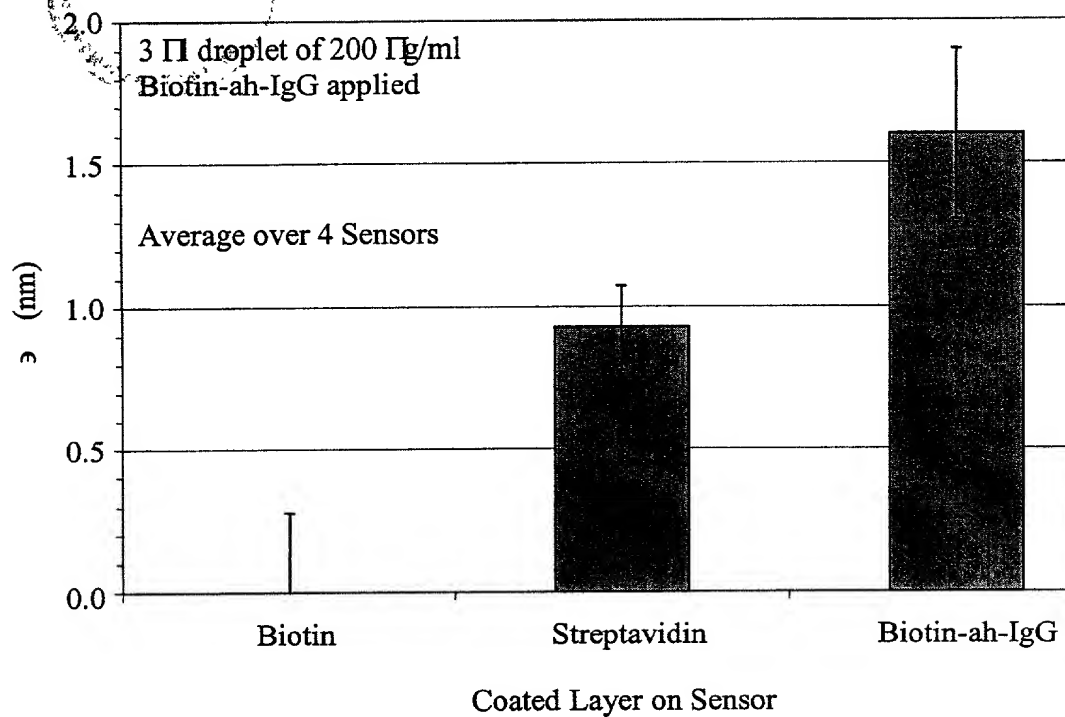


Figure 37A

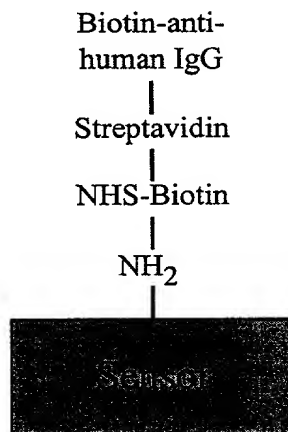


Figure 37B

38/52

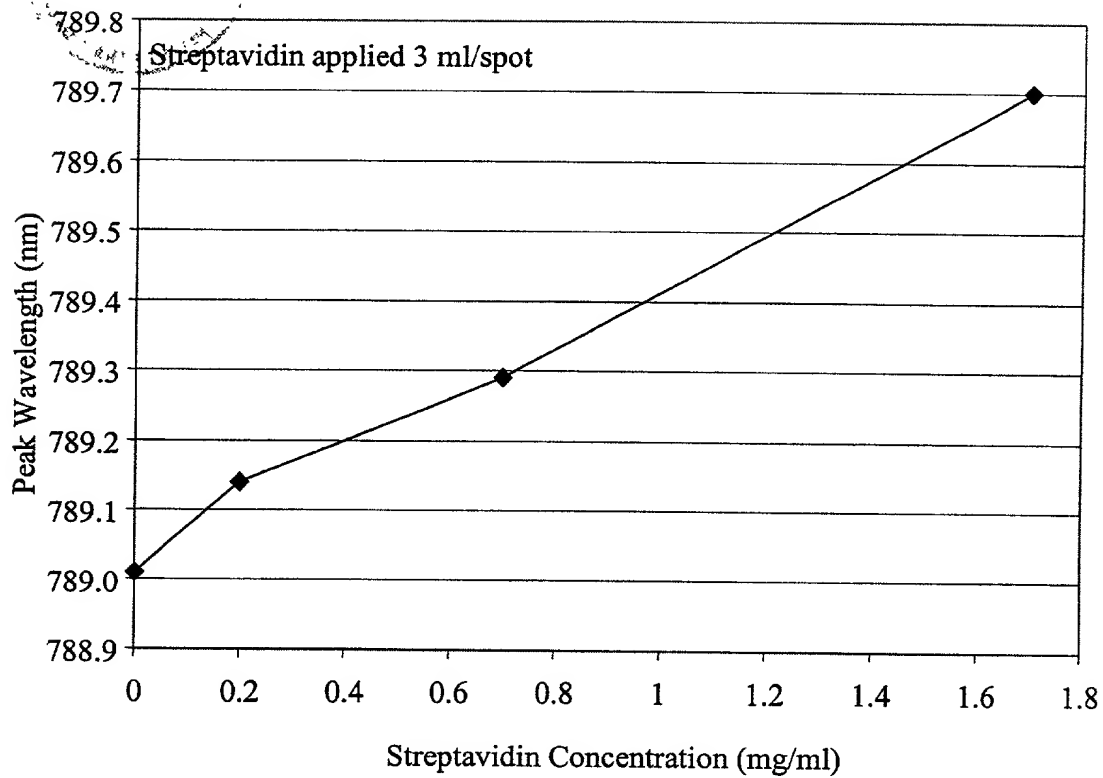


Figure 38A

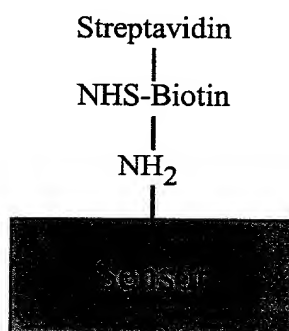


Figure 38B

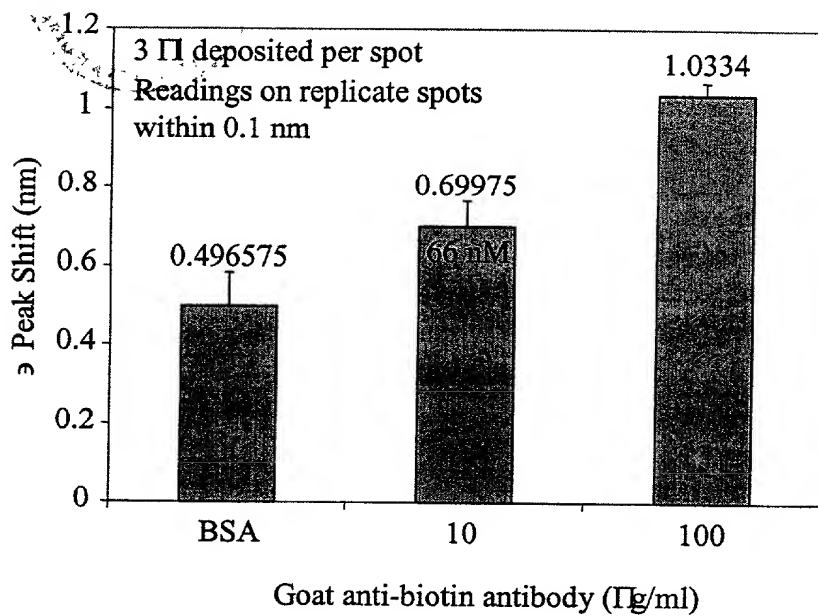


Figure 39A

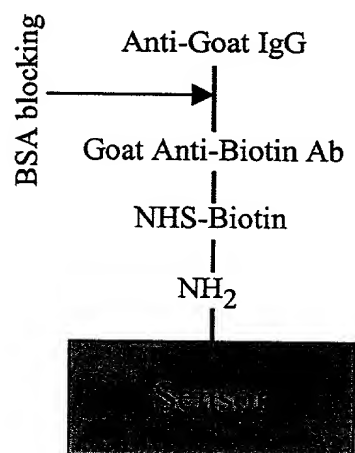


Figure 39B

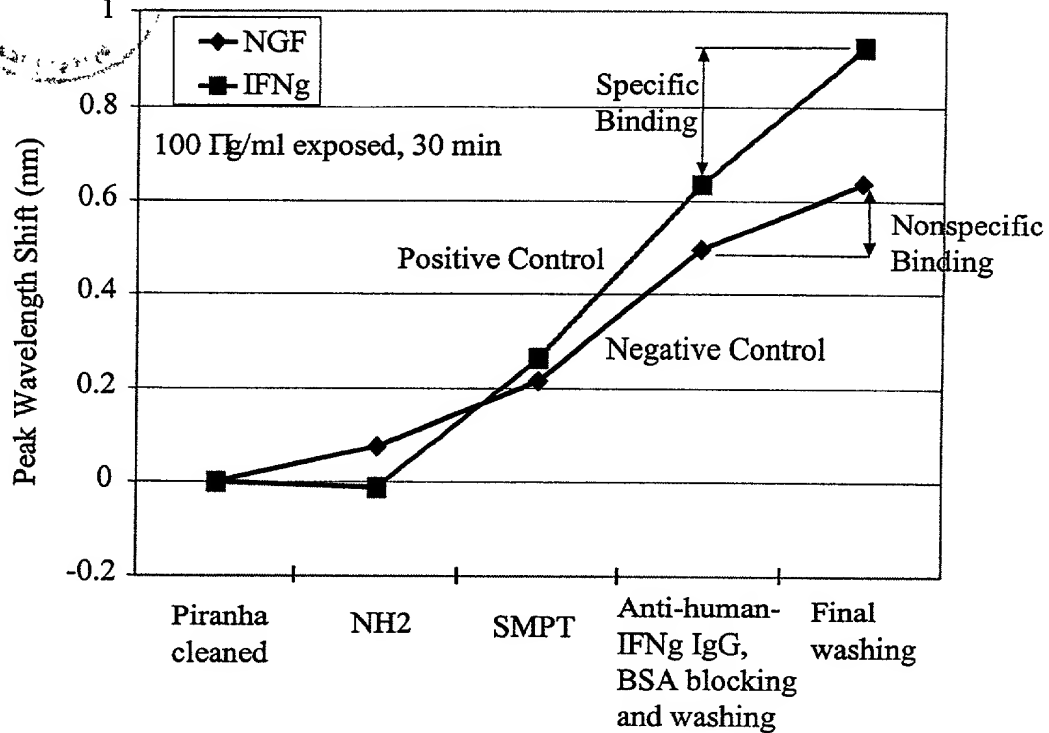


Figure 40A

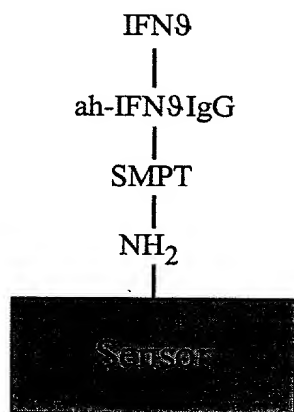


Figure 40B

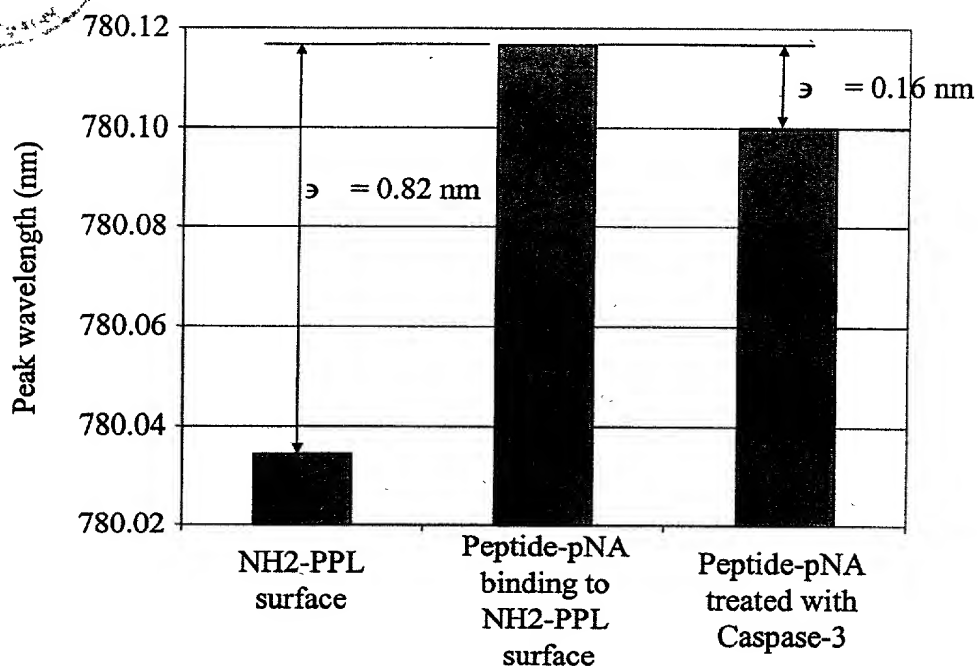


Figure 41A

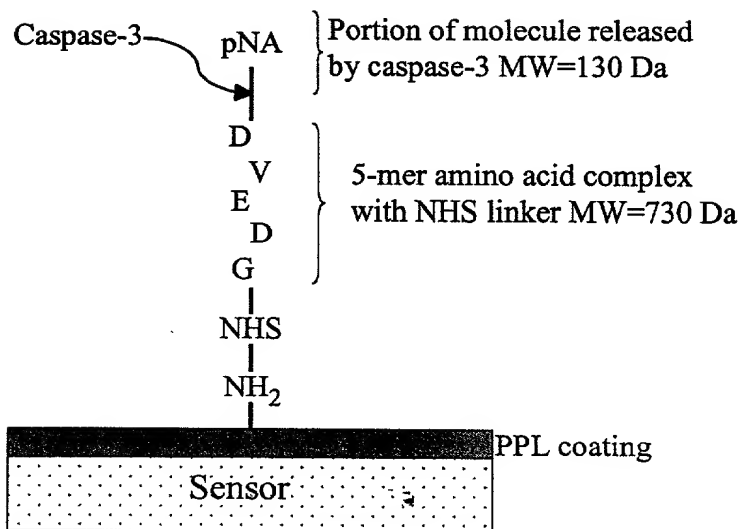


Figure 41B

Measured shifting of the resonant wavelength caused by the binding of various biomolecular layers.

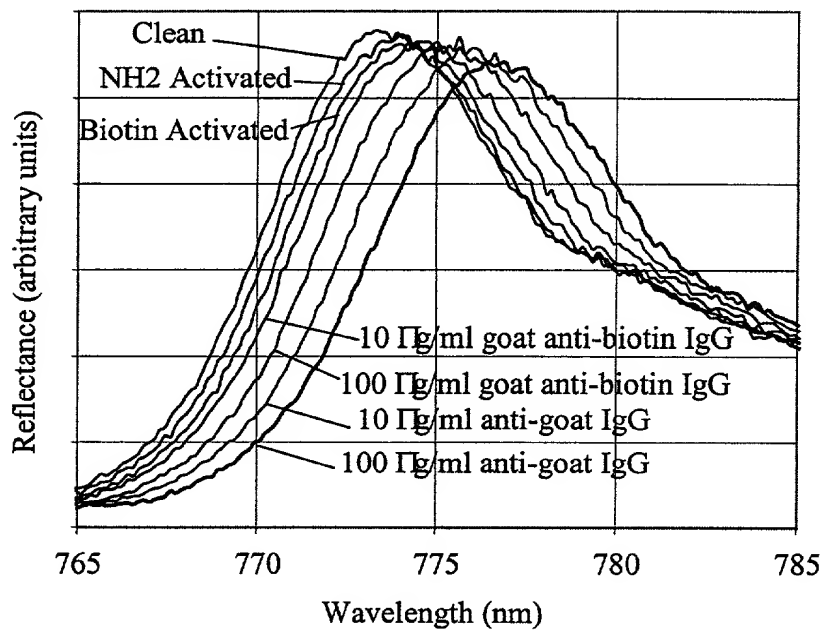


Figure 42A

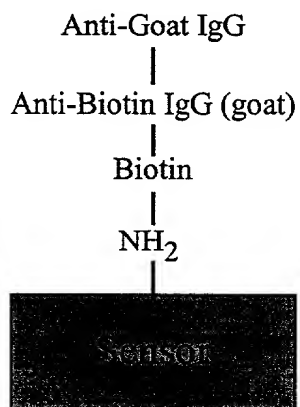


Figure 42B

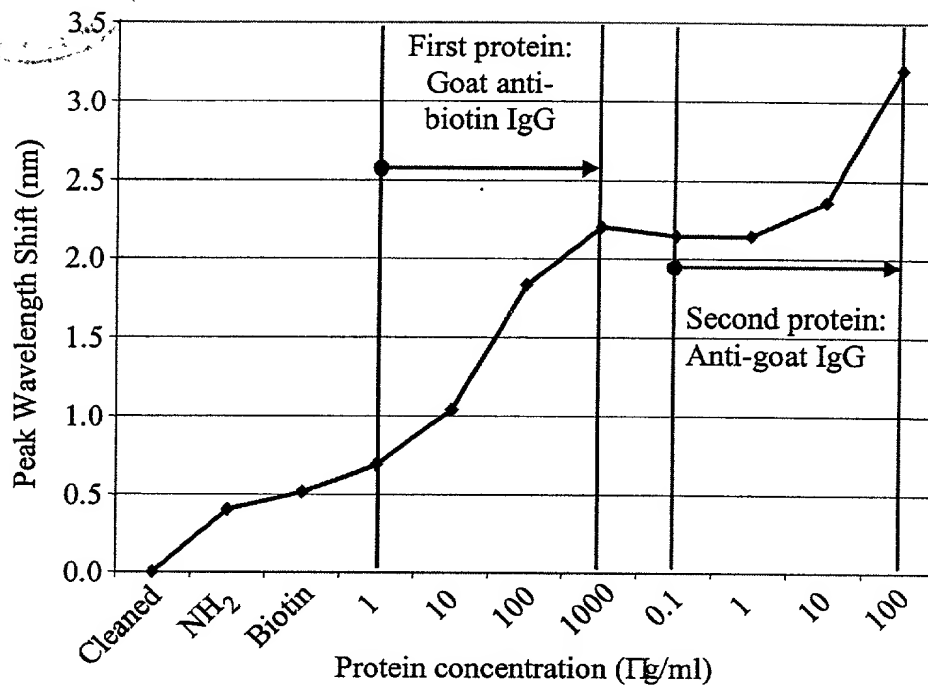


Figure 43A

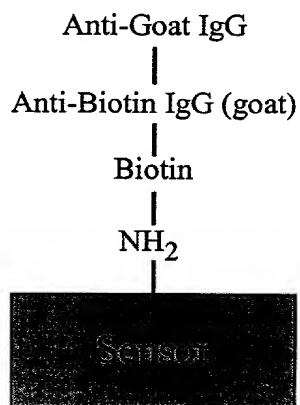


Figure 43B

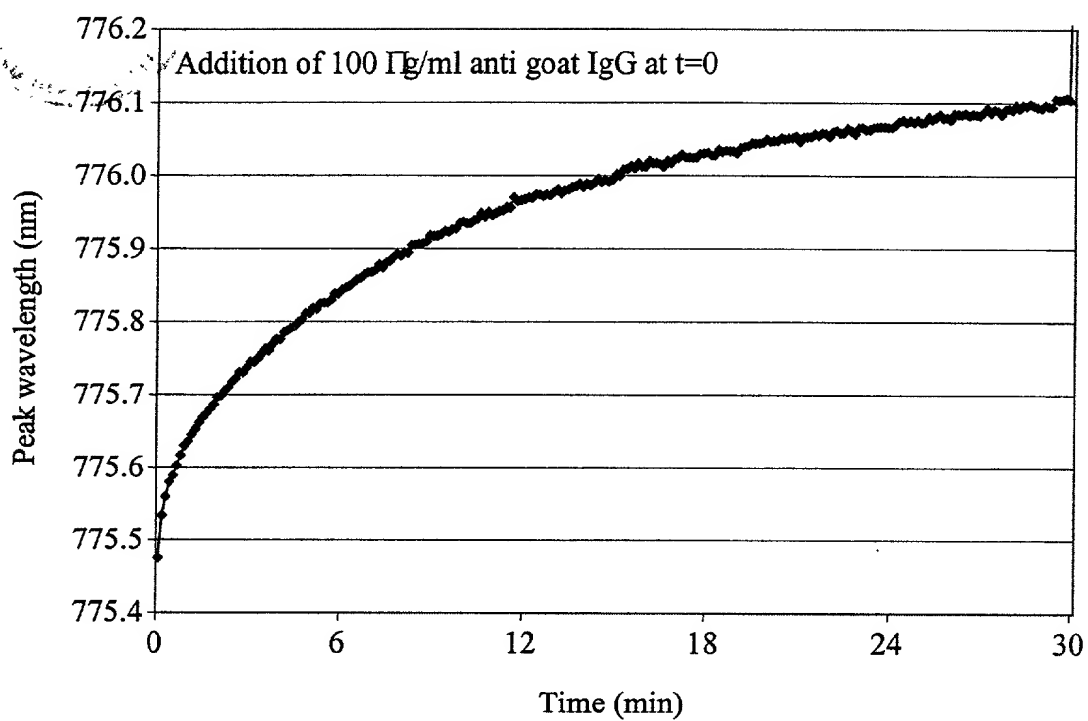


Figure 44A

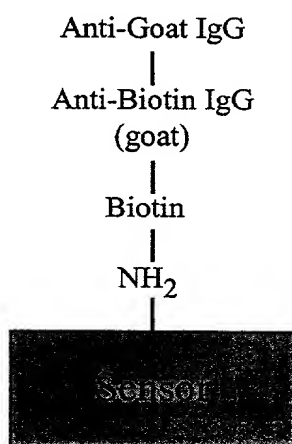


Figure 44B

45/52

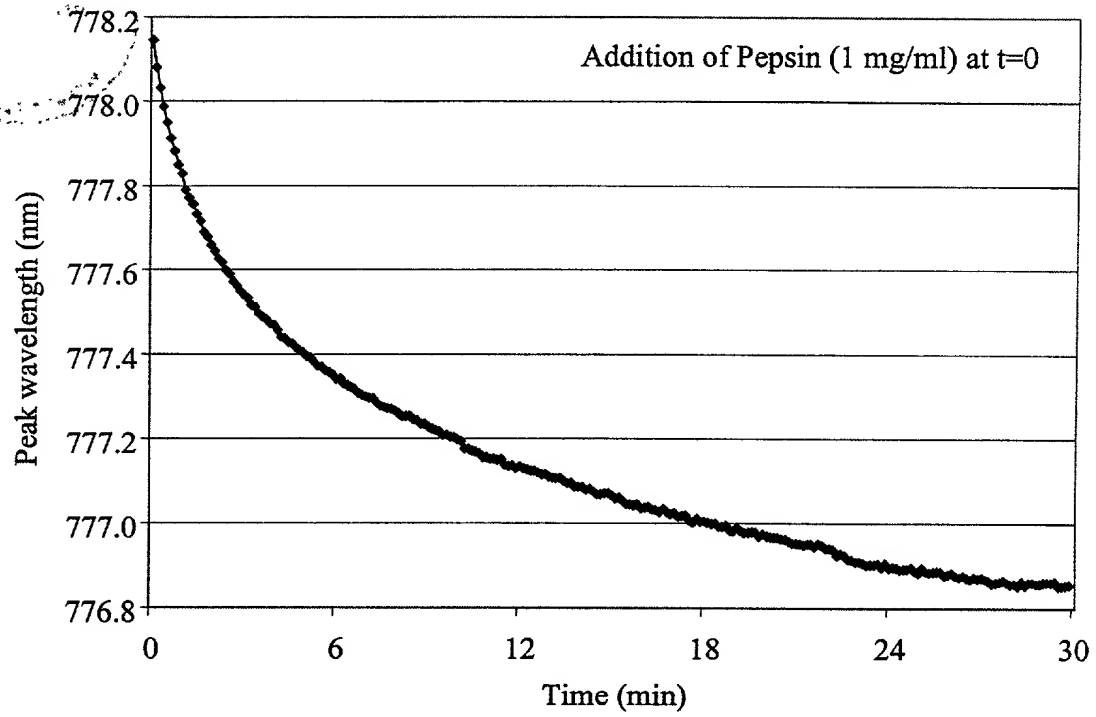


Figure 45A

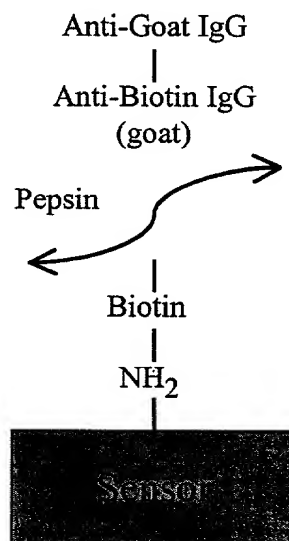


Figure 45B

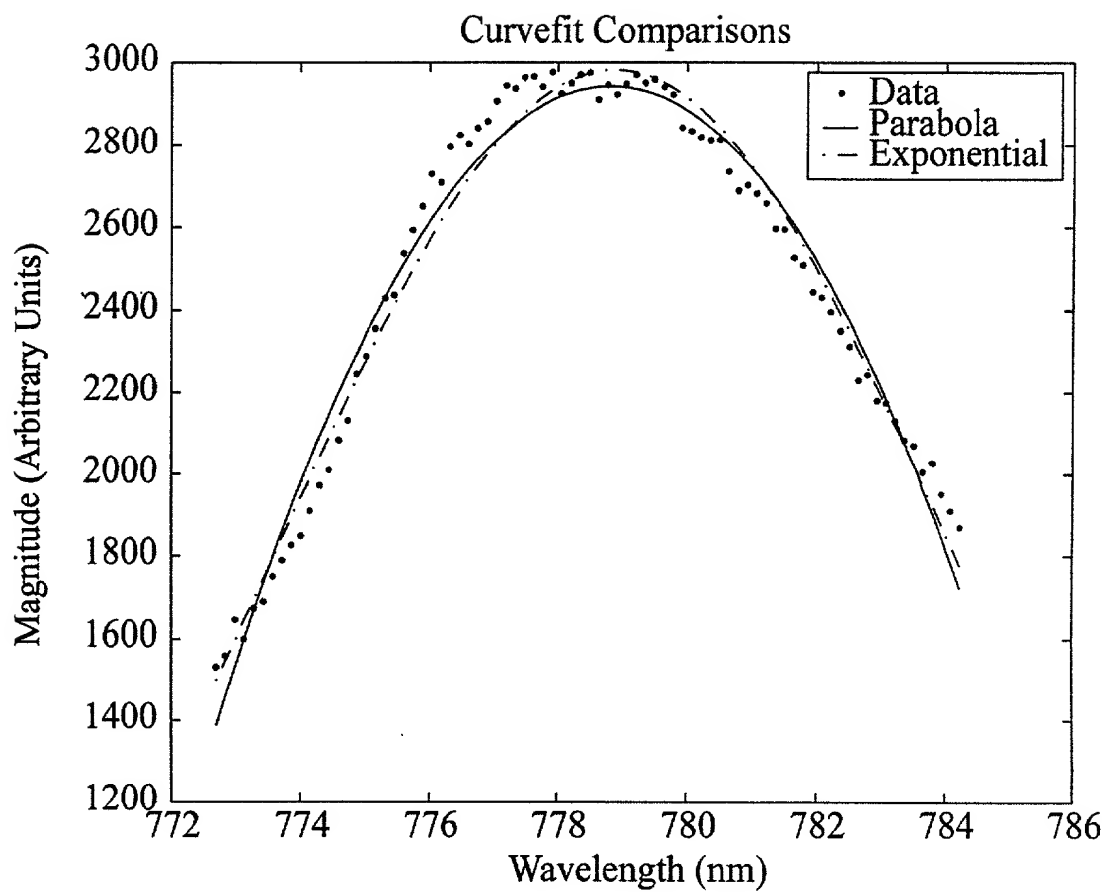


Figure 46

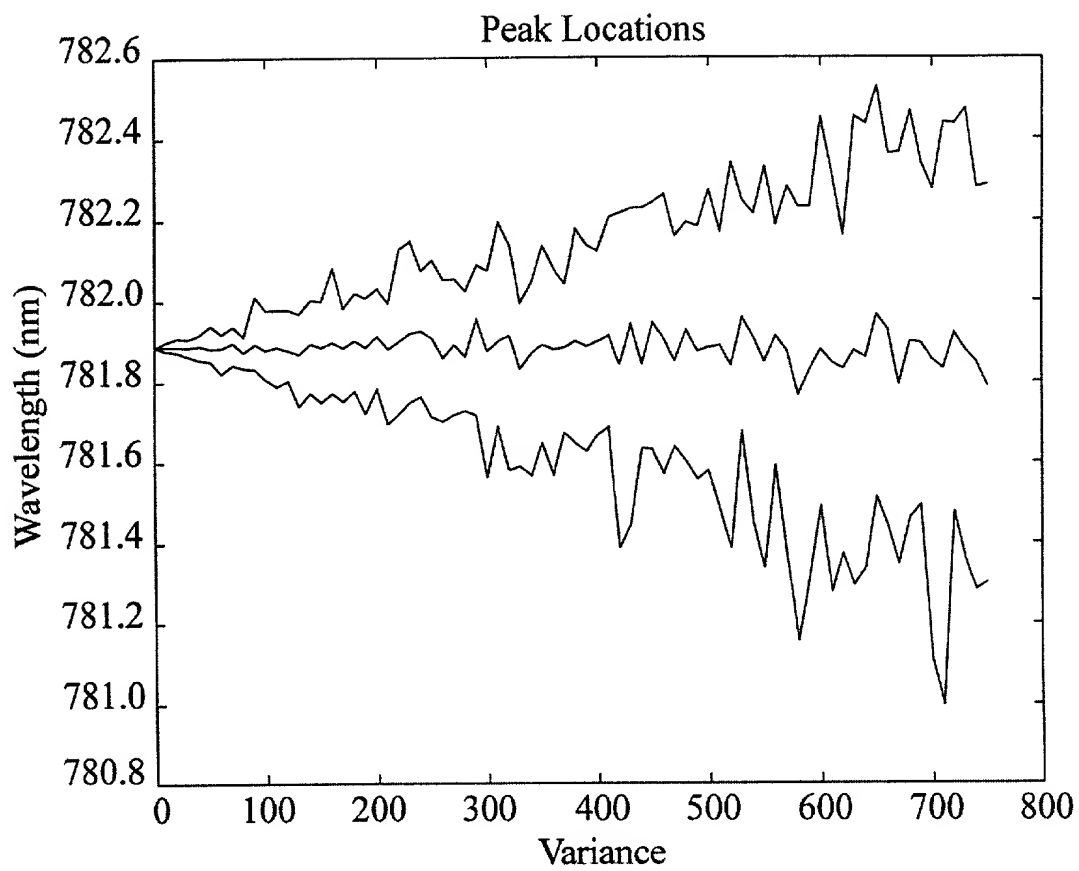
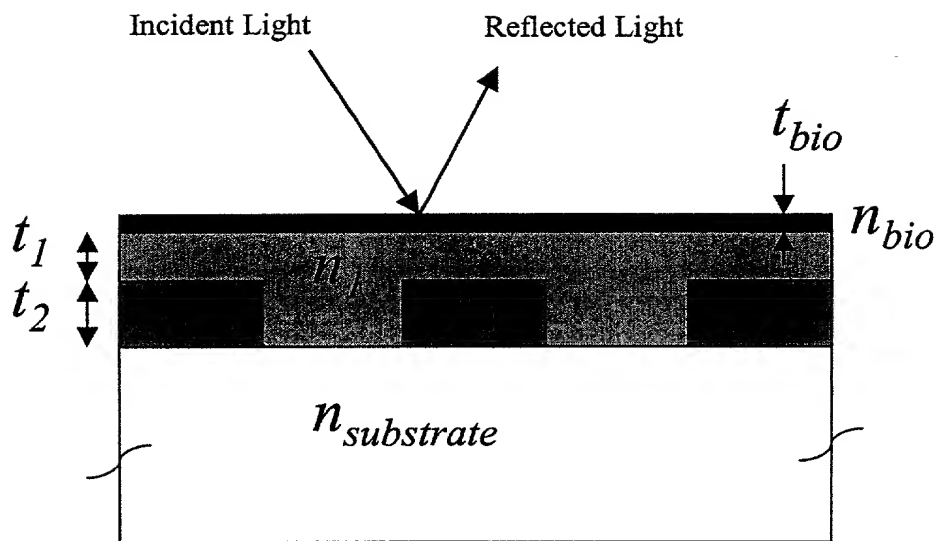


Figure 47



Material 1 = Electrical Insulator (photoresist, epoxy, glass)

Material 2 = Indium tin oxide conductor

Substrate = Glass

Figure 48



Concentric Circle Design

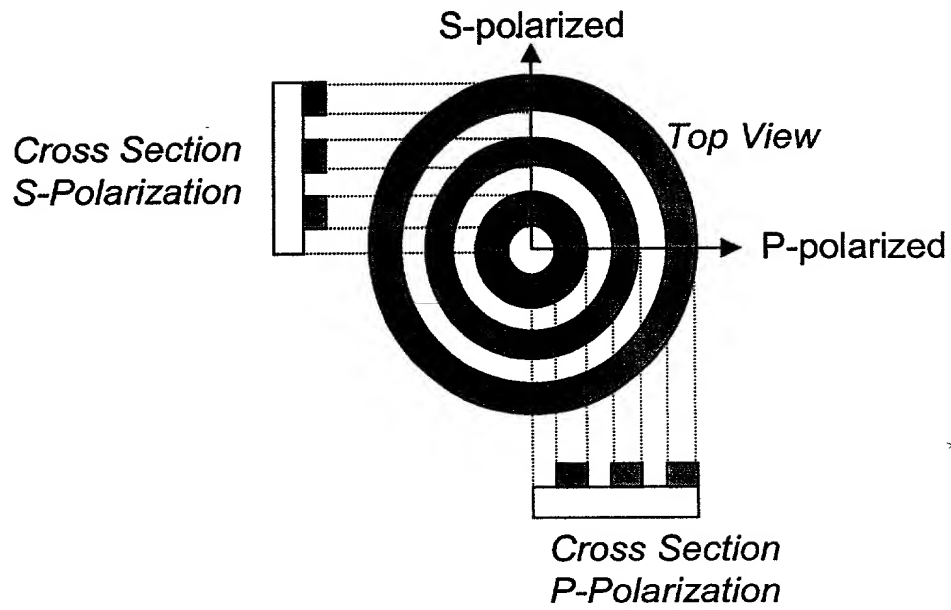


Figure 49



Hexagonal Grid Design

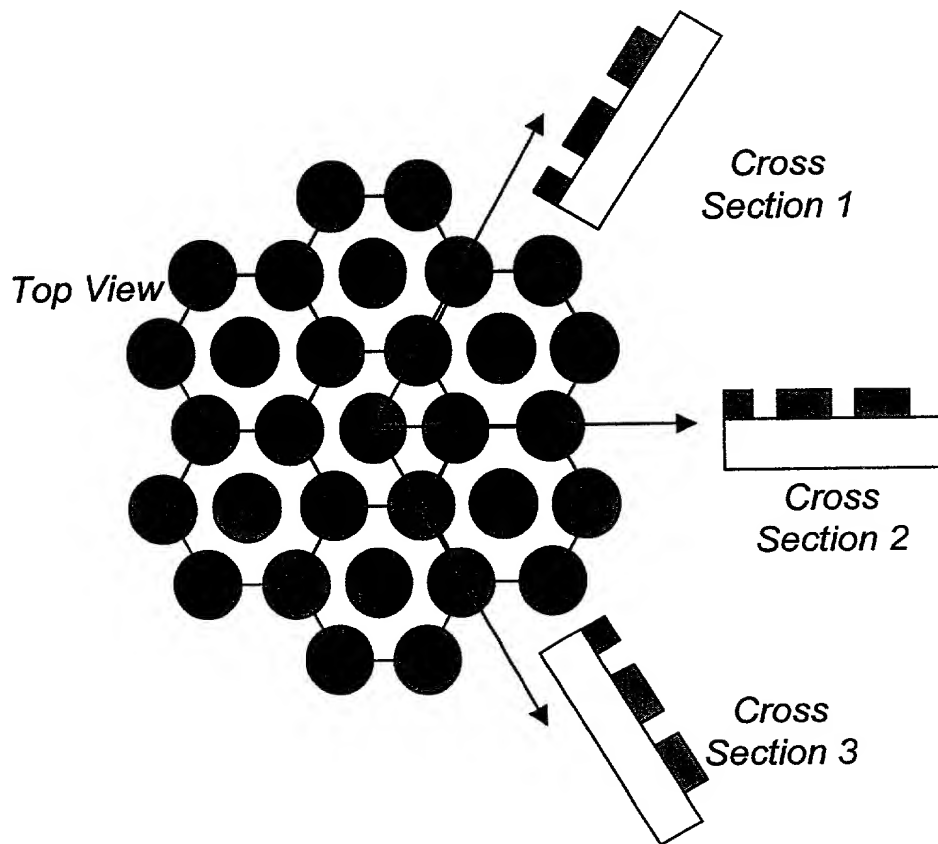


Figure 50

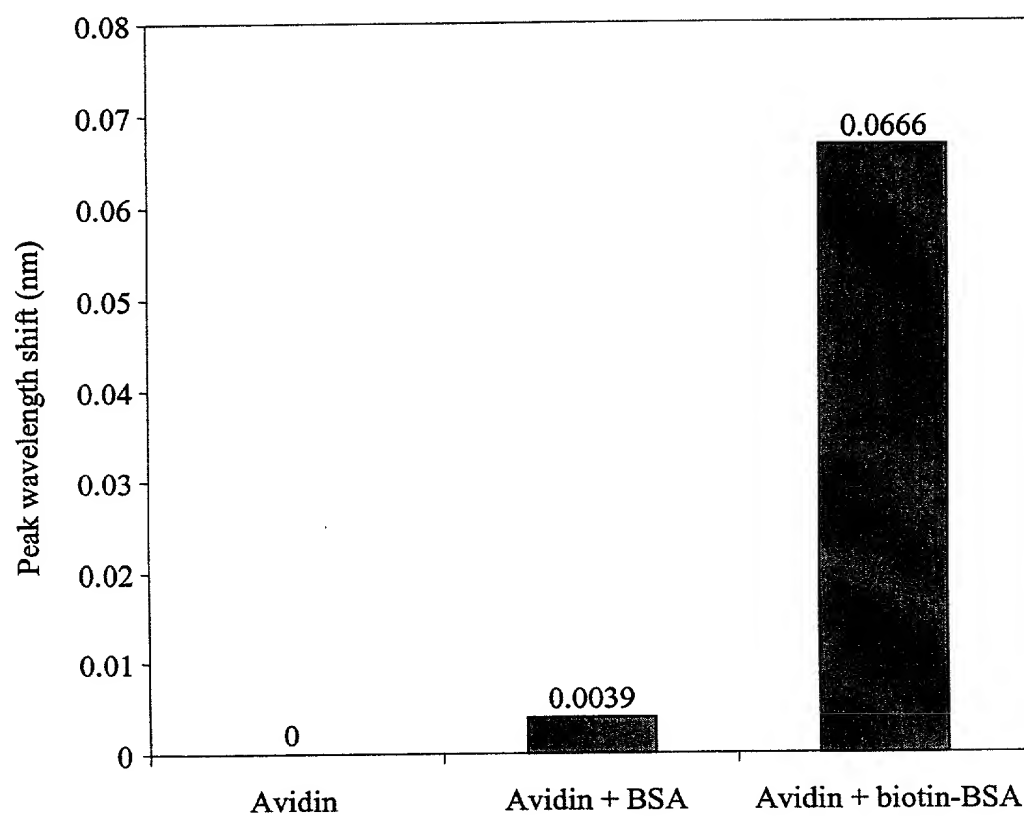


Figure 51

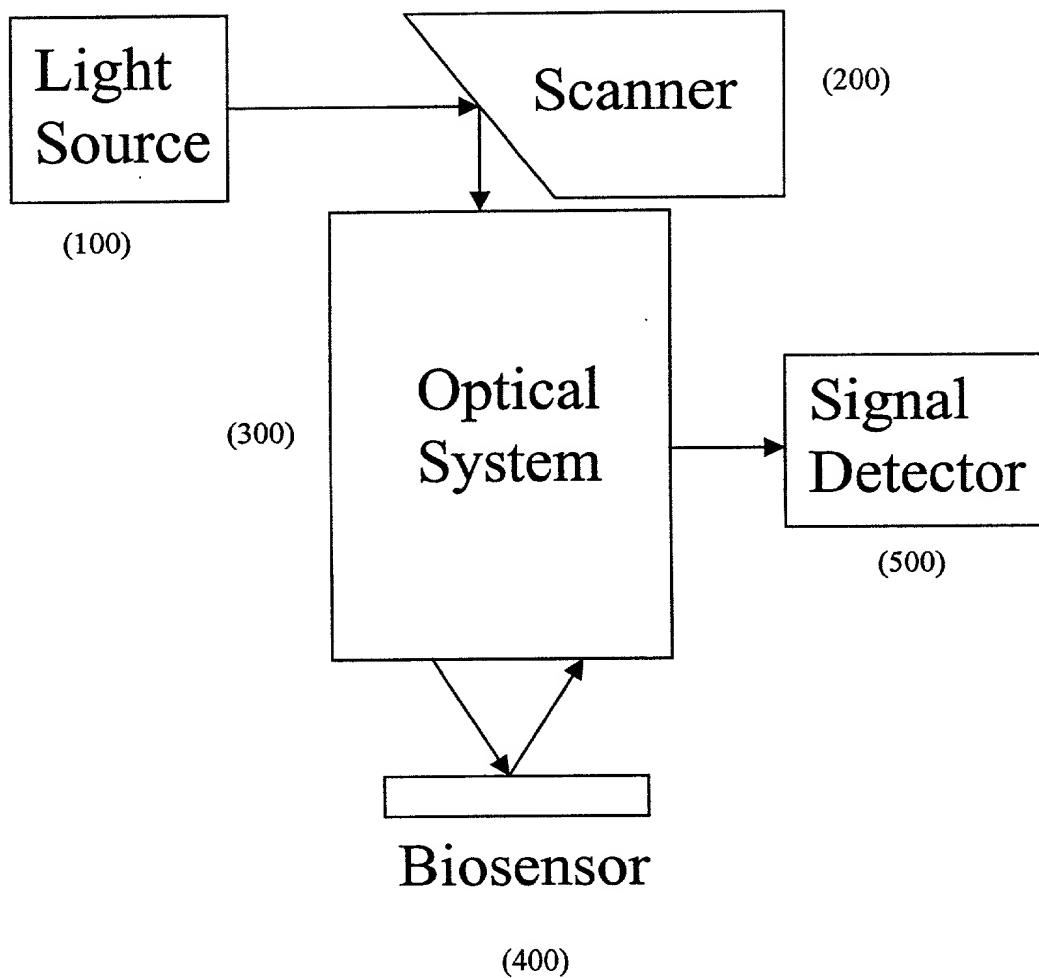


Figure 52